

A NEW SPECIES OF *JAPANAGROMYZA*  
(DIPTERA: AGROMYZIDAE) FROM FLORIDA,  
WITH A KEY TO NORTH AMERICAN SPECIES

BRIAN M. WIEGMANN

Department of Entomology, University of Maryland, College Park, Maryland 20742.

---

*Abstract.*—The new species *Japanagromyza polygonivora* is described from Florida, based on specimens reared from blotch mines in a smartweed, *Polygonum* sp. (section *Persicaria*). This is the first record of an agromyzid attacking this plant in North America. A revised key to the North American species is provided to help separate this species from other known members of the genus.

*Key Words:* Agromyzidae, *Japanagromyza*, *Polygonum*, smartweed, leaf-miner

---

*Japanagromyza*, originally described for six species from Japan (Sasakawa 1958), is now known from nearly all zoogeographic regions. It is represented in the Indopacific by 16 species (Sasakawa 1963), 7 in Australia (Spencer 1977), and 20 in the Neotropical region (Spencer and Stegmaier 1973). In North America, only 5 species were recorded until Spencer and Steyskal (1986) added an additional one from the Western United States, which significantly broadened the generic concept. The latter authors also provided a revision of the North American species.

Larvae of this genus attack a wide variety of hosts. Nearly all make blotch mines and pupate in the soil (Spencer and Steyskal 1986). In North America, species of *Japanagromyza* have been recorded mining leaves of Fabaceae and Fagaceae. Although in Europe, *Agromyza pittodes* Hendel is known to attack *Polygonum viviparum* and *A. polygoni* Hering is recorded from *Polygonum bistorta*, no North American species of agromyzid has ever been associated with plants in the family Polygonaceae.

The discovery of *Japanagromyza polygonivora*, new species, from Florida, mining

the leaves of a smartweed *Polygonum* sp. (sect. *Persicaria*), is of considerable interest taxonomically, as well as biologically. This fly lacks the prescutellar bristles and has 2 pairs of dorsocentrals showing its possible relationship with *J. perpetua* and *J. desmodivora*. Because species of the genus normally have only 2 pairs of dorsocentrals, a character common in the genus *Melanagromyza*, and it frequently possesses prescutellars, a character of the genus *Agromyza*, it is often considered intermediate between these two groups. These characters vary significantly throughout the group, however, and their phylogenetic utility must be left uncertain until a more detailed analysis is undertaken. The presence of two apical midtibial bristles indicates its placement in the *Japanagromyza*. The distinctive shapes of the epandrium and surstylus indicate that it is new.

In this paper, I describe as new *Japanagromyza polygonivora*, give a brief generic diagnosis, and provide a key to the North American species of the genus.

METHODS

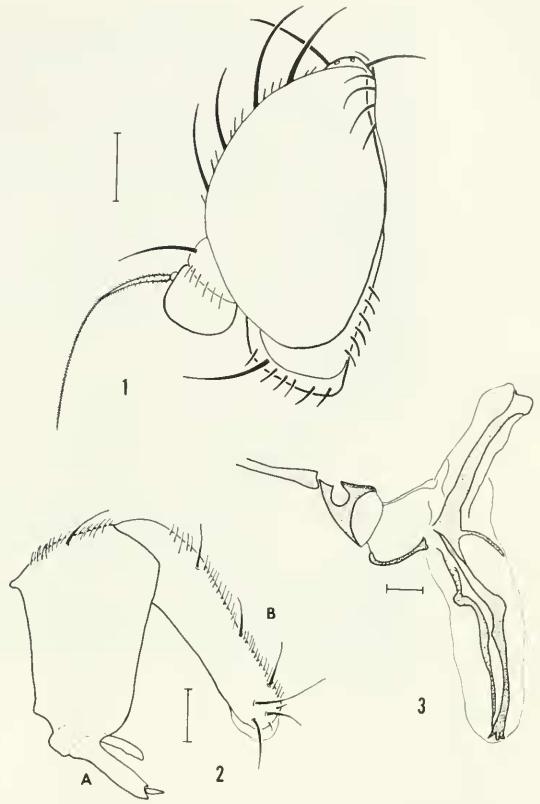
In this paper, morphological terminology follows the convention used by Spencer and

Steyskal (1986) to allow for effective communication and comparison of male genital features. There has been considerable debate over the homologies of the structures of the male genitalia of higher Diptera (Griffiths 1972, McAlpine 1981, Wiegmann 1989), leading to alternative terminologies for these structures. My use of the terms epandrium and surstyli (McAlpine 1981, Spencer and Steyskal 1986) (= periandrium and gonostyli of Griffiths 1972) is not an endorsement of either genitalic homology theory, but reflects the usage of other workers in Agromyzidae (i.e. Spencer 1976).

Descriptions of characters were made using a Wild Optics dissecting scope at 25 $\times$ . Measurements were made with an objective micrometer. Genitalia were dissected cleared in KOH, and preserved in glycerin for further study. Leaf mines were collected from Brevard Co., near Melbourne, Florida on 15-v-1986 by K. Hibbard and F. Smith, and adults were reared by H. Weems. Emergence was on or near 10-xii-1986. For information on rearing Agromyzidae from their mines see Spencer and Steyskal (1986).

*Japanagromyza* Sasakawa, 1958: 138. Type species *Agromyza duchesneae* Sasakawa, 1954: 106, original designation.

**Diagnosis:** Robust black flies, 1.5–3.0 mm long; frons normally black or brownish, approximately equal to width of eye, as long as or narrower than wide; upper orbitals 2; lower orbitals 2; gena narrow, 0.05–0.12 of eye height; 1st flagellomere rounded to oval; arista bare or with microscopic pubescence; mesonotum normally with 0+2 dorsocentrals; acrostichals 8 to 10 rows; prescutellars 1 pair, sometimes lacking; halter white or yellow, often with black base; wing 1.5–2.5 mm long; costa reaching M1+2; foretibia with one lateral bristle, midtibia with two; male genitalia with epandrium ventrally articulated to hypandrium; surstylus directed inwards or downwards, often with several stout spines or terminal uncus; cercus variable often with stout internal spines, or long



Figs. 1–3. *Japanagromyza polygonivora* Wiegmann n. sp. male. 1, Head, lateral view (bar = 0.07 mm); 2, Epandrium with (A) surstylus, (B) cercus, lateral view (bar = 0.03 mm); 3, Aedeagus (bar = 0.04 mm).

black hairs; aedeagal hood lightly sclerotized or partly membranous; distal tubule long, membranous, often coiled.

KEY TO NORTH AMERICAN  
*JAPANAGROMYZA* ADAPTED FROM  
SPENCER AND STEYSKAL (1986)

- 1. Dorsocentrals 3+1; frons reddish .....  
..... *rutiliceps* (Melander)
- Dorsocentrals only 2 post sutural (0+2); frons  
black or brown ..... 2
- 2(1) Prescutellars absent ..... 3
- Prescutellars present ..... 5
- 3(2) Mesonotum distinctly greenish; cercus with  
numerous stout spines ..... *perpetua* Spencer
- Mesonotum matt grayish black, at most only  
faintly greenish; cercus with few or no stout  
spines, but with long fine hairs ..... 4







Fig. 9. *Japanagromyza polygonivora* Wiegmann n. sp. puparium, posterior view SEM.

spines; surstylus forked into 2 approximately equal appendages, ventral incurved, dorsal downcurved, with sharp apical spine (Fig. 2); cercus extending to level of surstyli, black with long fine black hairs, with thin apical flange exteriorly, without stout spines; hypandrium (Fig. 4) slightly longer than phallapodeme, without hypandrial apodeme; aedeagus as in Fig. 3, distiphallus  $\frac{1}{3}$  as long as phallapodeme, membranous; distal tubule straight not coiled; endophallus heavily sclerotized dorsally.

Female.—Identical to male in all characters except slightly larger in some dimensions such as frontal width and wing length.

*Female terminalia* (Figs. 6–8): Ovipositor sheath trapezoidal, black, lightly gray tomentose, as long as or slightly shorter than tergite 6; egg guides as in Fig. 8, with approximately 20 rectangular serrations; cercus with 2 long tactile sensilla and scattered long hairs (Fig. 7); spermatheca spherical unmodified (Fig. 6).

Host/early stages.—This species makes a

blotch mine in the leaves of *Polygonum* sp. Subsequent collection of the host-plant indicates that it is a smartweed in the section *Persicaria* of the genus *Polygonum* probably belonging to the species *P. densiflorum* Meissner. This identification was based on poorly preserved vegetative material, however, and should only be regarded as an approximate species determination. Further collections are needed to obtain a more precise host-plant determination. *Puparium*: 2.0–3.0 mm long, dark brown, visibly segmented; posterior spiracles ringed by 6–8 small projections on widely spaced conical protuberances (Fig. 9).

Type material.—Holotype, male, Florida, Brevard Co., near Melbourne, 15-V-86, Hibbard-Smith colls. The holotype, 1 male, and 2 female paratypes deposited USNM Washington D.C.; the remainder, 1 male, 4 females and 5 pupae collected at the same locality, were returned to the Florida State Collection of Arthropods, Gainesville.

The above description was made from the

series of specimens due to damage from being preserved in alcohol. Male paratypes were examined for characters missing in the holotype. The holotype is missing 1 upper orbital, 1 lower orbital, 1 flagellum, 1 dorso-central, and 2 of 4 scutellars.

*Diagnosis:* This species can be easily distinguished from the other *Japanagromyza* species from the Caribbean area by the unique appendages of the surstylus (Fig. 2) and the absence of prescutellar bristles.

*Etymology:* The name *polygonivora* is an adjective based on the larval feeding habit in the leaves of *Polygonum* sp.

#### DISCUSSION

The new species *Japanagromyza polygonivora* represents the first North American agromyzid attacking *Polygonum* sp. Further collections are needed to obtain an accurate species identification of the host-plant and to help determine the range of hosts in Polygonaceae. The close similarities between *J. polygonivora* and the other members in the genus illustrate the difficulties in making species level identifications in the Agromyzidae. The male genitalia are crucial in distinguishing between closely related members of this family. *J. polygonivora* is no exception with its distinctive forked surstylus which is unique in the genus.

#### ACKNOWLEDGMENTS

I would like to thank Dr. H. V. Weems Jr. and G. C. Steyskal for providing me with the specimens, and D. Miller, F. C. Thompson, T. Henry and G. C. Steyskal of the Systematic Entomology Laboratory, USDA for their comments on the manuscript. I also gratefully acknowledge K. Hibbard of the Florida Department of Agriculture, Di-

vision of Plant Industry for collecting specimens of the host-plant and Bryan Dutton, Department of Botany, University of Maryland for his assistance with host-plant identification.

#### LITERATURE CITED

- Griffiths, G. C. D. 1972. The phylogenetic classification of Diptera Cyclorrhapha, with special reference to the structure of the male postabdomen. *Series Entomologica* no. 8, 340 pp. Dr. W. Junk N.V., the Hague.
- McAlpine, J. F. 1981. Morphology and terminology—Adults. 2, pp. 9–63. In McAlpine, J. F. et al., eds., *Manual of Nearctic Diptera*. Research Branch, Agriculture Canada Monograph 27(1): 1–674.
- Sasakawa, M. 1954. Neue Agromyzidae aus Japan. *Transactions of the Shikoku Entomological Society* 4: 35–49.
- . 1958. The female terminalia of the Agromyzidae with description of a new genus (1). *Scientific Reports of the Saikyo (Kyoto) University of Agriculture* no. 10: 133–145.
- . 1963. Oriental Agromyzidae (Diptera) in Bishop Museum, 1. *Pacific Insects* 5: 25–50.
- Spencer, K. A. 1966. New and interesting Agromyzidae from Florida. *Stuttgarter Beiträge zur Naturkunde* 158, 20 pp.
- . 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica*, vol. 5, part 1, Scandinavian Science Press, Klampenborg, Denmark, 304 pp.
- . 1977. A revision of the Australian Agromyzidae (Diptera). *West Australian Museum Special Publication* No. 8., 225 pp.
- Spencer, K. A. and C. E. Stegmaier. 1973. The Agromyzidae of Florida with a supplement on species from the Caribbean. *Arthropods of Florida*, vol. 7, 205 pp.
- Spencer, K. A. and G. C. Steyskal. 1986. *Manual of the Agromyzidae (Diptera) of the United States*. U. S. Dept. of Agriculture, Agriculture Handbook No. 638, 478 pp.
- Wiegmann, B. M. 1989. A phylogenetic revision of the family Atelestidae (Diptera: Empidoidea) and its implications for the origin of the cyclorrhaphous Diptera. viii + 205 pp. University of Maryland, M.Sc. thesis.